Emotion Detection and Sentiment Analysis System

Abstract

This project presents an intelligent Emotion Detection and Sentiment Analysis System developed using Python in Visual Studio Code. The system utilizes the DeepFace library to detect and classify human emotions in real-time through camera input or pre-recorded videos. The goal is to enable machines to interpret facial expressions and understand emotional context, enhancing human-computer interaction.

Introduction

Emotion detection and sentiment analysis are essential components of modern artificial intelligence. These technologies allow systems to analyze facial expressions, voice, or text to understand the emotional state of users. This project focuses on facial emotion recognition using the DeepFace library, an advanced deep learning framework that supports multiple pre-trained models such as VGG-Face, Facenet, and OpenFace.

Methodology

The system was implemented in Python using Visual Studio Code. The DeepFace library was integrated to analyze images captured from a live webcam or video feed. The workflow involves three main steps: capturing the frame, analyzing it using DeepFace's emotion detection model, and displaying the predicted emotion. The program runs continuously to detect emotions in real-time, such as happiness, sadness, anger, fear, disgust, surprise, and neutral.

System Workflow

1. Video or camera input is captured using OpenCV or similar libraries.
2. Each frame is passed to DeepFace for analysis.
3. The detected emotion is displayed on the screen in real time.
4. Optionally, the results can be stored for further sentiment analysis.

Results and Discussion

The system successfully detected emotions from live video streams with high accuracy. It was able to differentiate between various emotions in different lighting and facial conditions. Real-time processing was achieved efficiently due to the optimization of DeepFace's pre-trained models.

Conclusion

The Emotion Detection and Sentiment Analysis System demonstrates how artificial intelligence can interpret human emotions from facial expressions. This project can be expanded by integrating voice or text-based sentiment analysis for a more comprehensive emotion recognition system. Future improvements could involve deploying the system in mobile or web applications to reach a wider range of users.

Keywords: Emotion Detection, Sentiment Analysis, DeepFace, Python, Visual Studio Code, Machine Learning